Confirmation No.: 5082

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Roby et al.	Examiner: J. D. Anthony
Serial No.:	10/674,692	Group: Art Unit 1714
Filing Date:	September 30, 2003	Docket: T-6172A (538-58)
For:	ENGINE OIL COMPOSITIONS	

MAIL STOP AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

37 C.F.R. §1.131 DECLARATION OF PRIOR INVENTION MADE IN THE UNITED STATES TO OVERCOME CITED PATENT PUBLICATION

Sir:

I, Stephen H. Roby, hereby declare that:

1. I am an inventor for the above-referenced patent application, which was filed with the United States Patent and Trademark Office on September 30, 2003 and accorded application number 10/674,692.

2. This declaration is submitted to establish reduction to practice of the invention of the above-referenced patent application in the United States prior to September 24, 2002.

3. This declaration is submitted prior to issuance of a final rejection in the above-referenced patent application.

4. To establish the date of reduction to practice of the invention of the above-referenced patent application, the following document is attached hereto and submitted as evidence:

a. Exhibit 1 is an invention disclosure document together with an excel spreadsheet with the dates redacted.

5. The invention disclosure document provided as Exhibit 1 herein was completed at least before September 24, 2002.

6. The invention disclosure document and accompanying excel spreadsheet provided as Exhibit 1 to this Declaration shows a reduction to practice of the invention claimed in the above-referenced patent application. Conception of a lubricating oil composition is shown in OR# 90548 in the Excel spreadsheet and correspond to Example 1 of the subject application as filed and are within the scope of the claims.

7. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statement may jeopardize the validity of the application or any patent issuing thereon.

Date: October 16, 2006

Stephen H. Roby

Country of Citizenship: United States

Residence Post Office Address: 133 Onyx Court
Hercules, CA 94547

Attorney-Client Privilege

Invention Disclosure: T-6172 Organization: 1210 Attorney: SGL
Priority: A Date Received: Category: Field: AEO
Title: Ester Basestock for Improved Deposit Control in Passenger Car Motor Oils
Keywords: Cargill 560 Ester. TEOST MHT-4. TEOST 33.
Remarks: assigned A priority. Date of first draft: . Projected filing date:

Status: Pending: Serial Number: Filing Date:
Issued: US Patent Number: Issue Date:
Submitters: Roby, S.H.; Ruelas, S.G.
Descripiton of Invention:

The combination of a small amount of ester replacing a traditional mineral oil in a fully-formulated engine oil shows surprising deposit control in industry standard bench tests required for current specifications.

Modern Passenger Car Motor Oils (PCMOs) are formulated to control oxidation, wear, and deposits under demanding conditions. In addition to the demanding engine tests, two bench tests are required: the TEOST MHT-4 and the TEOST 33. Each of these bench tests has a specific appetite, the MHT-4 for diphenylamine antioxidant and the TEOST 33 for sulfonate detergent. These additives are expensive and are thought to contribute to undesirable lubricant properties like high temperature piston deposits (the diphenylamine), color (detergent), and wear performance (detergent). In addition, the detergent is relatively expensive and contributes a significant proportion to the cost of the finished lubricant package.

Esters have been used for many years as blend compatibility and seal swell agents in fully synthetic lubricants. Our study was designed to investigate the merits and debits of commercially available basestocks. We blended these esters into a cut-back commercial package (90% of normal treat to emphasize any performance differences of the esters). We originally treated the ester at 5 and 10%, the typical level used in synthetic engine oils.

The work to date is summarized in the attached Excel worksheet. All of the esters perform well and, in general, without much differentiation in the tests completed to date (the study is about ½ done with another set of esters just now on test). The exception to the sameness occurred with the Cargill AP560.

Cargill 560 is a polyol ester with "superior biodegradability." It is recommended for hydraulic fluids, metalworking fluids, and general lubricating oils.

When we used the Cargill ester at levels from 10 down to 1%, we found that TEOST MHT-4 and TEOST 33 performance dramatically improved. See the graph below.

The red horizontal line represents the current GF-3 maximum MHT-4 deposits allowed. The green horizontal line represents the GF-2 level of TEOST 33 deposits allowed. The TEOST 33 was not part of GF-3 but will be part of GF-4, probably with even tighter limits.

In summary, the Cargill ester can be used as a partial or perhaps full replacement of the diphenylamine and/or sulfonate detergent. This is the only ester evaluated that can significantly and consistently move the TEOST deposits. The ester allows us a unique path to formulate lower color, lower detergent, lower antioxidant, cheaper PCMO formulations.

Classified and Confidential

Invention Disclosure

Chief Patent Counsel Chevron Corporation, Law Department 555 Market Street, San Francisco, CA 94120-7141 This form is intended to help you describe your invention. You may need to attach additional pages including tables and drawings as appropriate. Additional pages should be signed, dated and witnessed.	**For Patent Unit Use Only** Item No. T-6172 Date Received by [illegible] Date Attorney Assigned SGE Organization Code 1210

I. Submitter(s):

(Print First Name/MI/Last Name):	(Home Address:Street/City/County/State/Zip):
Stephen H. Roby	133 Onyx Court/Hercules/Contra Costa/California/94547
Susanne G. Ruelas	2436 O'Connor Drive/San Pablo/Contra Costa/California/94806

II. Descriptive Title: A short title that summarizes and distinguishes your invention.

Ester Basestock for Improved Deposit Control in Passenger Car Motor Oils

(1) Field of Technology - A process, composition or apparatus/machine for what purpose?

The combination of a small amount of ester replacing a traditional mineral oil in a fully-formulated engine oil shows surprising deposit control in industry standard bench tests required for current specifications.

(2) Background - What is the problem being solved? How have others solved this problem? What is known in the art?

Modern Passenger Car Motor Oils (PCMOs) are formulated to control oxidation, wear, and deposits under demanding conditions. In addition to the demanding engine tests, two bench tests are required: the TEOST MHT-4 and the TEOST 33. Each of these bench tests has a specific appetite, the MHT-4 for diphenylamine antioxidant and the TEOST 33 for sulfonate detergent. These additives are expensive and are thought to contribute to undesirable lubricant properties like high temperature piston deposits (the diphenylamine), color (detergent), and wear performance (detergent). In addition, the detergent is relatively expensive and contributes a significant proportion to the cost of the finished lubricant package.

Esters have been used for many years as blend compatibility and seal swell agents in fully synthetic lubricants. Our study was designed to investigate the merits and debits of commercially available basestocks. We blended these esters into a cut-back commercial package (90% of normal treat to emphasize any performance differences of the esters). We originally treated the ester at 5 and 10%, the typical level used in synthetic engine oils.

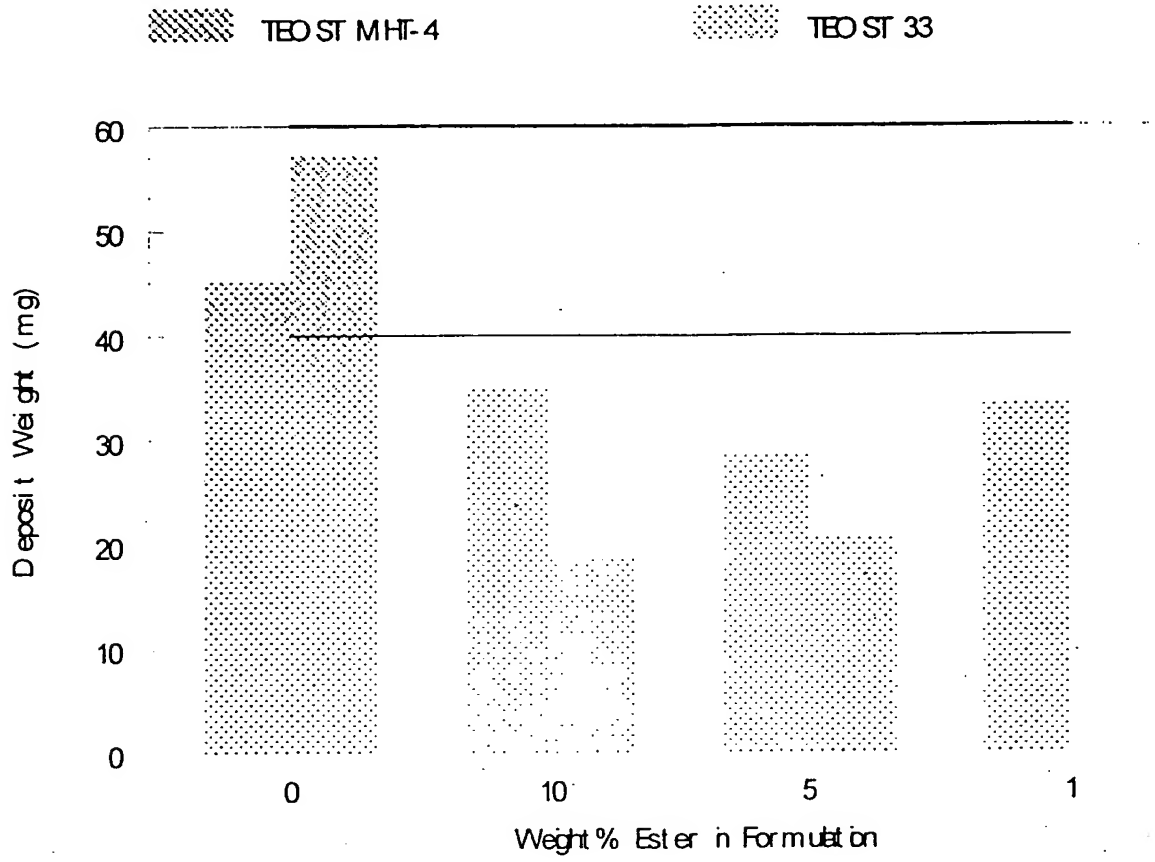
The work to date is summarized in the attached Excel worksheet. All of the esters perform well and, in general, without much differentiation in the tests completed to date (the study is about ½ done with another set of esters just now on test). The exception to the sameness occurred with the Cargill AP560.

Cargill 560 is a polyol ester with "superior biodegradability." It is recommended for hydraulic fluids, metalworking fluids, and general lubricating oils.

When we used the Cargill ester at levels from 10 down to 1%, we found that TEOST MHT-4 and TEOST 33 performance dramatically improved. See the graph below.

Effect of Cargill AP560 on TEOST

90% Treat of OLOA 55005 (Group II, SL, All Grades)



The red horizontal line represents the current GF-3 maximum MHT-4 deposits allowed. The green horizontal line represents the GF-2 level of TEOST 33 deposits allowed. The TEOST 33 was not part of GF-3 but will be part of GF-4, probably with even tighter limits.

In summary, the Cargill ester can be used as a partial or perhaps full replacement of the diphenylamine and/or sulfonate detergent. This is the only ester evaluated that can significantly and consistently move the TEOST deposits. The ester allows us a unique path to formulate lower color, lower detergent, lower antioxidant, cheaper PCMO formulations.

3) Description of the Invention - Describe your invention in broad, general terms and also include at least one specific example of your invention. Discuss what is unique, novel, or different about your invention and how you get your unique results. Point out any surprising or unexpected results.

(4) Supporting Data - Attach examples, notebook pages, run sheets, tables, reports, test data, etc. State how these support your invention and/or how the data is unexpected or surprising.

IV. Disclosure to Third Parties - Please inform the Law Department of any disclosure of this invention to third parties.

Do you or others plan to discuss this invention with anyone outside of Chevron — Yes X (Eventually, with Cargill) — No ☐

Do you plan to publish your invention? Yes X No ☐

Will samples be sent to others? Yes ☐ No X

Will this invention be field tested? Yes ☐ No X

Have you done a literature search? Yes ☐ No X

List the relevant patent or literature references (attach copies if available)

V. Other Contributors - Other than the submitters, who else may have contributed to this invention?

Rich Mayer (useful bench testing suggestions), Bill Kleiser (other potential applications/benefits like low color)

VI. Signature of Submitter(s): The invention described above is submitted pursuant to my employment agreement.

(Signed) _____ Full First Name Initial Last Name Date

(Signed) _____ Full First Name Initial Last Name Date

(Signed) _____ Full First Name Initial Last Name Date

(Signed) _____ Full First Name Initial Last Name Date

VII. Signature of Witness [preferably person to who submitter(s) made first disclosure]: This invention was first explained to my be the submitter(s) on or before _____ 19__, and is understood by me.

(Signed) _____

(Printed) RICHARD J MAYER
Full First Name Initial Last Name

Name of Supervisor: _____

Table 3: Base Stock Ester Screening (Evaluation #1)

		90% Baseline												
OR#		90546	90547	90550	90548	90551	90549	90552	90553	90554	90829	90946	90947	90948
Blend#		0202389	0202390	0202416	0202393	0202417	0202415	0202418	0202419	0202420	0203320	203583	203584	203585
OLOA		55005	55005	55005	55005	55005	55005	55005	55005	55005	55005	55005	55005	55005
XA		22009	22009	22009	22009	22009	22009	22009	22009	22009	22009	22009	22009	22009
Treat, wt%		8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1
SAE Grade		5W30	5W30	5W30	5W30	5W30	5W30	5W30	5W30	5W30	5W30	5W30	5W30	5W30
OLOA 12002		1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44
OLOA 13000		2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34
OLOA 219		(49.5)	(49.5)	(49.5)	(49.5)	(49.5)	(49.5)	(49.5)	(49.5)	(49.5)	(49.5)	(49.5)	(49.5)	(49.5)
OLOA 262		(13.68)	(13.68)	(13.68)	(13.68)	(13.68)	(13.68)	(13.68)	(13.68)	(13.68)	(13.68)	(13.68)	(13.68)	(13.68)
OLOA 11007		0.117	0.117	0.117	0.117	0.117	0.117	0.117	0.117	0.117	0.117	0.117	0.117	0.117
OLOA 19022		0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
OLOA 2508J		0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
OLOA 54398		4.5 PM	4.5 PM	4.5 PM	4.5 PM	4.5 PM	4.5 PM	4.5 PM	4.5 PM	4.5 PM	4.5 PM	4.5 PM	4.5 PM	4.5 PM
ORPD1011		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Paratone 8451		10.1	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9
CHEVCA100N		78.1	74.2	70.3	74.2	70.3	74.2	70.3	74.2	70.3	78.2	78	78.2	8.2
CHEVCA220N		21.9	20.8	19.7	20.8	19.7	20.8	19.7	20.8	19.7	20.8	21.9	21.4	21.1
LEXOLUBE 2X-109			5	10										
LEXOLUBE 3N-310					5	10								
LEXOLUBE 4N-415							5	10						
CARGILL AP560									5	10	1	0.1	0.4	0.7
CCS		6237	6084	5994	5768	5300	5981	7865	5894	5583	6190	6116	6070	6025
Vis @ 100C		11.5	11.4	11.4	11.2	11.2	11.4	11.4	11.4	11.5	11.4	11.2	11.4	11.3
Vis @ 40C (AIMS 10107)		70.9	69.4	69.7	68.7	67.2	69.5	68.5	69.7	68.2	N.S.	N.S.	N.S.	N.S.
Vis @ 100C (AIMS 10107)		11.5	11.4	11.4	11.3	11.2	11.4	11.4	11.4	11.5	N.S.	N.S.	N.S.	N.S.
VI (AIMS 10107)		156	157	156	157	159	158	160	157	163	N.S.	N.S.	N.S.	N.S.
HTHS (SW D4683@150C)		3.21	3.21	3.32	3.21	3.19	3.21	3.25	3.24	3.27	N.S.	N.S.	N.S.	N.S.
LPTL Test Request#		202201635	202201635	202201636	202201635	202201636	202201635	202201636	202201636					
Oxidator BX (1414BX) Hrs. to rapid break		25.6	25.6	25.2	35.9	35	25.6	25.5	13.2					
Oxidator B (1414B) 1L O2/100g, Hrs.		25.2	18.7	23.7	32.8	22.2	23.6	24.6	9.3					
TFOUT (1427A), Induct. Period, min		203	212	247	230	228	249	262	190	140	N.S.	N.S.	N.S.	N.S.
ECR (Herguth)														
Film Formation Efficiency		67%	15%	7%	18%	3%	6%	5%	38%	81%	N.S.	N.S.	N.S.	N.S.
Avg. Friction Coefficient		0.113	0.0962	0.118	0.101	0.127	0.124	0.118	0.113	0.129	N.S.	N.S.	N.S.	N.S.
Standard Deviation in Friction Coefficient		0.16	0.156	0.165	0.143	0.165	0.161	0.144	0.174	0.164	N.S.	N.S.	N.S.	N.S.
Wear Scar Diameter, mm		0.15	0.13	0.12	0.16	0.22	0.12	0.11	0.11	0.15	N.S.	N.S.	N.S.	N.S.
											N.S.	N.S.	N.S.	N.S.
SWR														
TEOSTMHT		45.2	47.3	49.4	36.3	39.7	40.3	46.5	28.5	35.1	33.5	50.6	47.6	51
TEOST 33		57.3	82.2	105.4	39.7	34.7	36.2	36.4	20.6	18.8	36	56.9	48.9	48.6
TEOST 33 (repeat)		60.1												
BRT		92	89	91	90	90	87	90	85	92	N.S.	N.S.	N.S.	N.S.
Daimler Chrysler Seal Test	**Limits**													
DB AK6														
Change of Tensile Strength, %	-45 MAX	-1	-26	-24	-29	-38	-28	-33	-39	-35	N.S.	N.S.	N.S.	N.S.
Change of Elongation at Break, %	-50 MAX	-13	-29	-31	-34	-32	-27	-32	-36	-28	N.S.	N.S.	N.S.	N.S.
Change of Shore-a-hardness, Points	-5 - 5	0	0	1	1	0	1	1	-1	-1	N.S.	N.S.	N.S.	N.S.
Change of Weight, %	0 - 5	2	0.5	0.6	0.5	0.7	0.5	0.5	0.5	0.6	N.S.	N.S.	N.S.	N.S.
Pass / Fail		P	P	P	P	P	P	P	P	P	N.S.	N.S.	N.S.	N.S.
DB NBR34						1								
Change of Tensile Strength, %	-20 MAX	-1	4	4	-2	-12	-1	-6	2	2	N.S.	N.S.	N.S.	N.S.
Change of Elongation at Break, %	-35 MAX	-13	-22	-12	-19	2	-15	-23	-12	-6	N.S.	N.S.	N.S.	N.S.
Change of Shore-a-hardness, Points	-8 - 2	0	-3	-2	0	2.8	-1	-3	-3	-3	N.S.	N.S.	N.S.	N.S.
Change of Weight, %	0 - 10	2	2.2	2.4	2.3	P	2.1	2.4	2.1	2.3	N.S.	N.S.	N.S.	N.S.
Pass / Fail		P	P	P	P		P	P	P	P	N.S.	N.S.	N.S.	N.S.
DB EAM														
Change of Tensile Strength, %	-35 MAX	-1	7	-4	-7	-3	-3	-4	-8	-5	N.S.	N.S.	N.S.	N.S.
Change of Elongation at Break, %	-45 MAX	-19	-20	-14	-25	-15	-18	-22	-27	-11	N.S.	N.S.	N.S.	N.S.
Change of Shore-a-hardness, Points	-5 - 5	2	-1	-2	-1	-4	-1	-3	-2	-4	N.S.	N.S.	N.S.	N.S.
Change of Weight, %	0 -15	7.1	9	10.8	9.4	12	8.8	11.5	9	10.6	N.S.	N.S.	N.S.	N.S.
Pass / Fail		P	P	P	P	P	P	P	P	P	N.S.	N.S.	N.S.	N.S.
DB ACM														
Change of Tensile Strength, %	-30 MAX	19	18	13	13	2	13	2	10	2	N.S.	N.S.	N.S.	N.S.
Change of Elongation at Break, %	-45 MAX	-36	-37	-37	-39	-34	-37	-36	-36	-28	N.S.	N.S.	N.S.	N.S.
Change of Shore-a-hardness, Points	-2 - 6	6	5	6	6	6	7	5	5	4	N.S.	N.S.	N.S.	N.S.
Change of Weight, %	-3 - 10	2.2	2.4	2.9	2.8	3.3	2.4	2.9	3	3.1	N.S.	N.S.	N.S.	N.S.
Pass / Fail		P	P	P	P	P	F	P	P	P	N.S.	N.S.	N.S.	N.S.
Volkswagen Seal Test														
VW EAM														
Change of Tensile Strength, %		-17	-24	-23	-24	-22	-21	-24	-24	-31	N.S.	N.S.	N.S.	N.S.
Change of Elongation at Break, %		-38	-36	-38	-40	-38	-37	-38	-40	-39	N.S.	N.S.	N.S.	N.S.
Change of Shore-a-hardness, Points		-2	-4	-4	-4	-7	-4	-5	-5	-8	N.S.	N.S.	N.S.	N.S.
Change of Weight, %		12.8	14.4	17.3	16.4	18.3	15.2	18	17.5	17.6	N.S.	N.S.	N.S.	N.S.
Pass / Fail		F	F	F	F	F	F	F	F	F	N.S.	N.S.	N.S.	N.S.
VW ACM														
Change of Tensile Strength, %		-1	1	3	3	3	2	-4	1	2	N.S.	N.S.	N.S.	N.S.
Change of Elongation at Break, %		-20	-21	-15	-21	-15	-20	-24	-19	-9	N.S.	N.S.	N.S.	N.S.
Change of Shore-a-hardness, Points		5	5	4	4	3	4	2	0	-3	N.S.	N.S.	N.S.	N.S.
Change of Weight, %		2	2.3	2.6	2.5	3.1	2.2	2.7	2.7	2.8	N.S.	N.S.	N.S.	N.S.
Pass / Fail		P	P	P	P	P	P	P	P	P	N.S.	N.S.	N.S.	N.S.
Compats 3 months (TS)														
1 Day		1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	N.S.	N.S.	N.S.	N.S.
1 Week		1/0	1/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	N.S.	N.S.	N.S.	N.S.
1 Month		2/0	1/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	N.S.	N.S.	N.S.	N.S.
2 Months		2/0	1/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	N.S.	N.S.	N.S.	N.S.
3 Months														